PARC PBN Procedures Naming Action Team Product

Presented to: ACF 15-1

Date: April 29, 2015

Goal

- **Propose response to PARC Steering Group**
  - From PARC to FAA
- **Get final comments from PARC SG**
- **Approval to finalize comments to provide final report to AVS-1**

Purpose of the AT

1. **Goal: Identify how the charts used by pilots to fly PBN Instrument Procedures need to be modified to remove confusion and aid in pilot understanding of requirements and how to fly the procedures.**

2. **Follow-up to PARC PBN Charting Report and recommendations from 2011**

Purpose of the AT

- **Develop Specific Proposals (Everything is on the table)**
    - Approach proposals
    - Departure (SID, ODP) presentations
    - Arrival procedures (STAR)
- **Enroute (Future Work)**
    - RNAV 2, RNP 2 (Where, Why, What will be different from RNAV 2)
    - Advanced RNP   (Where, Why, What will be different ?)
    - RNP 0.3   (Where, Why, What will be different ?)

PARC Recommendations

In overview, the Action Team and PARC recommendations to the FAA are:

1.That all PBN Approach procedure titles: begin with 'RNAV'; contain a suffix used to differentiate when there is more than one RNAV procedure to the same runway end; include only a single Navigation Specification (e.g. RNP AR) in parentheses; and, contain the runway and number/letter.

2.That all PBN Departure Procedure (DP) and STAR procedure titles: include 'RNAV'; and, include only a single Navigation Specification (e.g. RNP 1, RNAV 1) in parentheses.

3.That all PBN procedures (Approach, DP and STAR) contain a PBN Requirement Box
   1. The 'box' would contain PBN-related information.

Meetings

- **Series of meetings beginning in October 2013**
  - Virtual meetings with PARC PBN Naming and Charting AT

Status

- **Looked at possibilities**
  - On PBN navigation specification per procedure
  - Multiple navigation specifications on same chart
    - Transitions
  - Mixing PBN with ILS
    - Multiple Navigation Specifications with ILS for final approach

PBN Requirements Box Information

- **Background & Overview: The ICAO Doc 8168, Volume II Amendment six specifies "PBN items shall be separated out and published in a PBN Requirements Box ..." This guidance is consistent with the 2011 PARC Procedure Naming Action Team Report which stated: "It is recommended that all PBN procedures (Approach, DP and STAR) contain a PBN Requirement Box. The 'box' would contain PBN-related information, e.g., supporting sensors, specific functionality not mandatory within the Navigation Specification..."**

- **The current PARC Action Team, herein and after referred to as the AT, concurred with the above recommendations for a 'PBN Requirement Box'.**

- **The elements of the 'PBN Requirement Box' consist of:**
  - **Its location**
  - **Its content and the sequence of that content**
  - **Recommended abbreviations and/or acronyms**

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PBN Requirements Box Information

- **Location of the PBN Requirement Box**

- **The ICAO guidance[1] stated the PBN Box should be "... published in a PBN Requirements Box on the plan view of the chart immediately below the chart identifier." The AT identified several problems with the ICAO recommendation for location of the PBN Box (refer to minutes 12-13 December 2013 meeting).**

- **Team Response from October 20, 2014 telecon: Group agreed with recommendation, noting a nuance, the recommendation does not force another vendor to locate the PBN Requirement Box in the same spot, but does recommend that any vendor locate the PBN Box in a consistent location on the instrument approach procedures.**

  - **AT recommendation is to locate the PBN Requirement Box in a consistent location**
    - **In the examples the AT proposed to make it part of the Briefing Strip at the top of the US Government Chart**

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Location of the PBN Requirement Box

CARLSBAD, CALIFORNIA   AL-5310 (FAA)   00000

WAAS CH **45831** W24B	APP CRS **245°**	Rwy Idg **4897** TDZE **326** Apt Elev **331**	RNAV X RWY 24

MC CLELLAN-PALOMAR (CRQ)

RNP APCH — GPS, RF Required

▽ △ For uncompensated Baro–VNAV systems, LNAV/VNAV NA below -4°C (25°F) or above 54°C (130°F). For inoperative MALSR, increase LNAV Cats A/B visibility to RVR 5000. Helicopter visibility reduction below RVR 4000 not authorized. Inoperative table does not apply to LPV.

MALSR
A5

MISSED APPROACH: Climb to 2000 direct IBUGE and hold.

ATIS **120.15**	SOCAL APP CON **127.3 323.0**	PALOMAR TOWER ★ **118.6** (CTAF) **276.4**	GND CON **121.8**	CLNC DEL **134.85**

PBN Requirements Box Information

- **Location of the PBN Requirement Box**

- **On departures and arrivals, PBN Requirements Box should be in a consistent location (e.g. Top Right or Top Middle) but not a floating note. (Refer to page 4 of 12-13 Dec Minutes).**

- **Team Response from October 20, 2014 telecon: Reason for previous objections to floating note, it would move around in the plan view of the depiction, and difficult to post in a digital product. The group would like to see the PBN Requirement Box to be in "Preferred" location. Put in a box on US SIDS/STARS. PARC AT likes keeping the PBN Equipment in a briefing strip, in consistent locations. AT agrees with the recommendation as written**
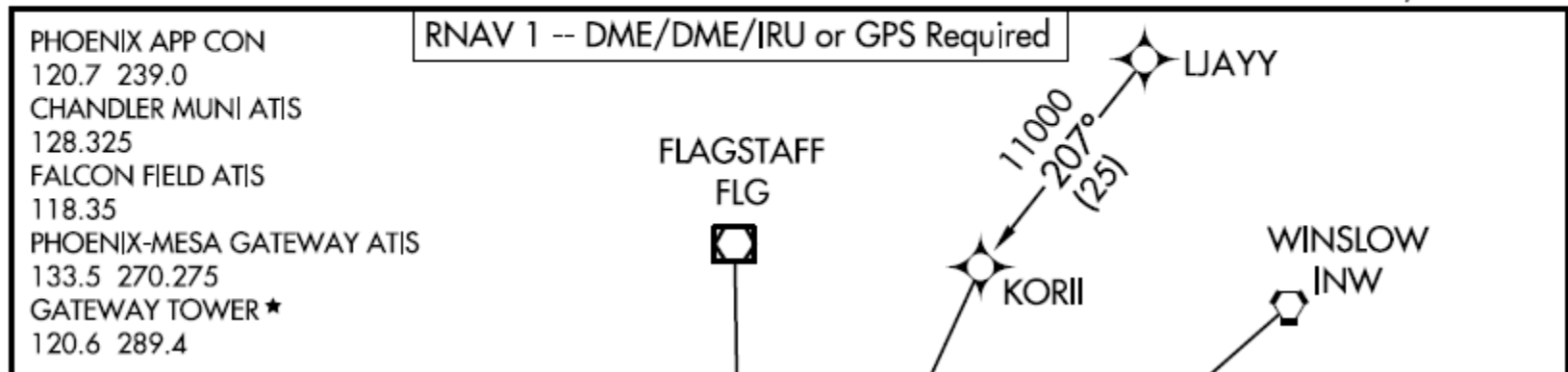
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Location of the PBN Requirement Box SID/STAR

(DSERT.DSERT2) 00000
DSERT TWO ARRIVAL (RNAV)   ST-322 (FAA)   PHOENIX, ARIZONA

PHOENIX APP CON
120.7 239.0
CHANDLER MUNI ATIS
128.325
FALCON FIELD ATIS
118.35
PHOENIX-MESA GATEWAY ATIS
133.5 270.275
GATEWAY TOWER ★
120.6 289.4

RNAV 1 -- DME/DME/IRU or GPS Required

LJAYY

FLAGSTAFF
FLG

11000
207°
(25)

KORII

WINSLOW
INW

PBN Requirements Box Information

- **Content and sequence of elements in the PBN Requirments Box**

- **The ICAO guidance[1] stated "The PBN Requirements Box shall include the identification of the navigation specification used in the procedure design, any navigation sensor limitations and any required functionalities that are described as options in the navigation specification, that is, not included in the core navigation specification..." This guidance is also consistent with the 2011 PARC Report recommendations.**

- **The sequence of elements in the PBN Requirements Box should be consistent to facilitate training and understanding. The sequence should be: Nav Spec, Sensor (if a specific sensor is required), and Functional Requirements e.g. RF. If this standard sequence is used, headings are not needed. NOTE:** *The Functional Requirement is only annotated if it is an underline optional functional requirement for that Nav Spec.*

RNP APCH -- GPS, RF Required

PBN Requirements Box Information

- **Content and sequence of elements in the PBN Requirements Box**
- **PBN Requirements Box Label**
  - **Does PBN Requirements Box require label?**
  - **Final agreement: No preamble " PBN…" first; the Nav Spec and sensor will be separated from the functional requirements with a dash or some means to differentiate between a functionality and the Nav Spec; "required" will come at the end of the text to indicate that the Nav Spec and functions which are in fact requirements for the common segment of the procedure.**

RNP APCH -- GPS, RF Required

PBN Requirements Box Information

- **Content and sequence of elements in the PBN Requirements Box**

Item	Acronym or Abbreviation	AT Recommendation	Notes
Acronym to be used for Nav Specs with a single numeric accuracy value	ICAO uses RNP or RNAV acronym followed by a space followed by the accuracy value e.g. RNAV 2, RNP 1, RNP 0.3. U.S. uses same convention.	Accepted	This includes "RNP 0.3" Nav Spec. The "RNP 0.3"Nav Spec only appears in the PBN Requirement Box for IAPs titled "COPTER" (because in the U.S. this Nav Spec is associated exclusively with helicopter operations).
Acronym or name to be used for Nav Specs with no single numeric accuracy value	RNP APCH	Accepted	AC 20-138D references "RNP APCH"
	RNP AR APCH	Accepted	ICAO predominantly refers to "RNP AR APCH" but also uses the acronym "RNP AR" e.g. in title to ICAO Doc 9905. FAA AC 20-138D uses "RNP AR APCH" 2 times, "RNP AR-APCH" 2 times, and "RNP AR" >50 times. [4]FAA AIM references "RNP AR APCH" in flight planning and uses text "RNP AR Instrument Approach Procedures" (see 5-4-18 in AIM)
	A-RNP	Accepted*	ICAO uses "A-RNP" as acronym

PBN Requirements Box Information

- **<u>Sensor Requirement Rules – PBN Requirements Box</u>**
- **Therefore the following PBN Requirement Box rules for sensor depiction are proposed:**
  - **The absence of any sensor requirement in the PBN Requirements Box indicates that any approved sensor compatible with the Navigation Specification is approved**
  - **The PBN Requirements Box sensor depiction will indicate a requirement for a sensor by the FAA, prohibited sensors will not be indicated. (This is in harmony with the PBN Manual A 5.1.2.1 and the previous decision of the AT on the "DME/DME RNP-0.3" note.).**
  - **For the Spaced Based Component will continue to use GPS as the satellite system approved for use with RNP in the US.**

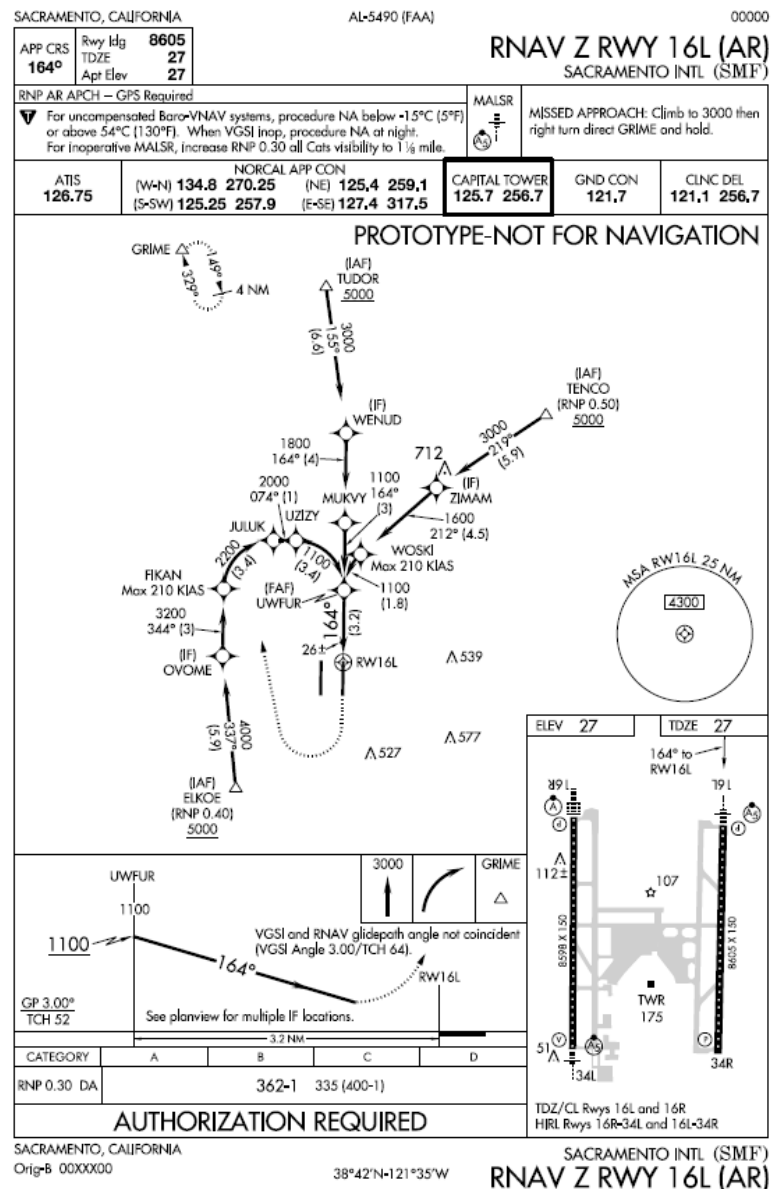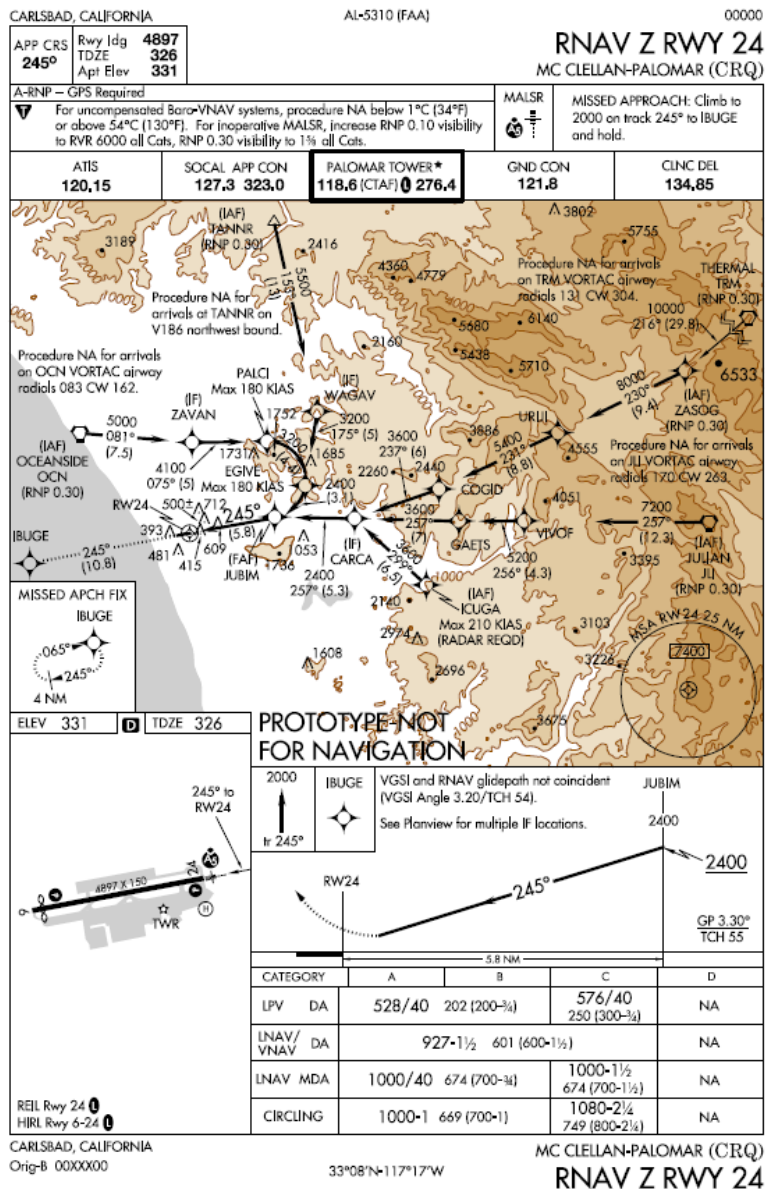| RNP APCH -- GPS, RF Required		MALSR	MISSED APPROACH:
▽ ▲	For uncompensated Baro-VNAV systems, LNAV/VNAV NA below -4°C (25°F) or above 54°C (130°F). For inoperative MALSR, increase LNAV Cats A/B visibility to RVR 5000. Helicopter visibility reduction below RVR 4000 not authorized. Inoperative table does not apply to LPV.	Ⓐ5	Climb to 2000 direct IBUGE and hold.

PBN Requirements Box Information

- **PBN Requirements Box Acronyms – 3rd element: Functional Requirement Acronym**

Functionality	Acronym
Radius to Fix	RF
Parallel Offset	Not identified in PBN Requirements Box
Scalability	Not identified in PBN Requirements Box
Fixed Radius Transition	Not used on Terminal Charts
Time of Arrival Control	TOAC (Note: Used by ICAO and RTCA DO-236) Table 2

  – **Currently for procedures where scalability is used, it is identified with the unique RNP value for the segment of the procedure in the Plan View.**

   - **Scalability won't be identified in the PBN Requirement Box as the aircraft will have to be Advanced RNP or RNP AR APCH in which scalability is a mandatory requirement.**
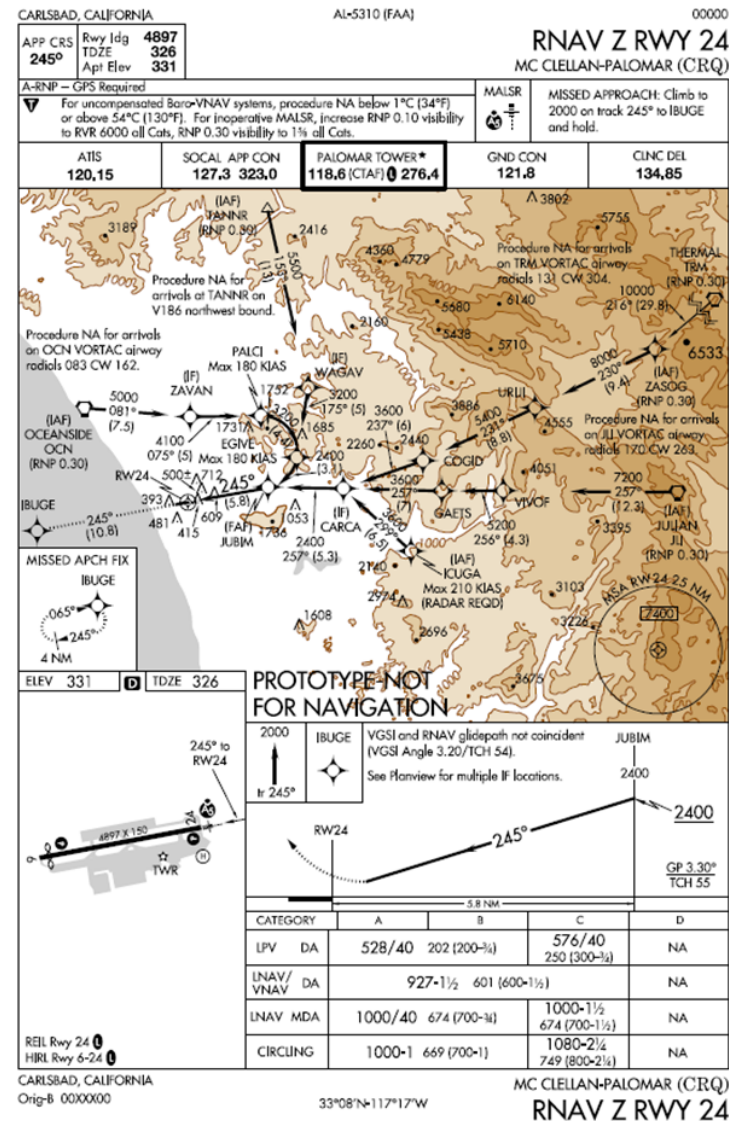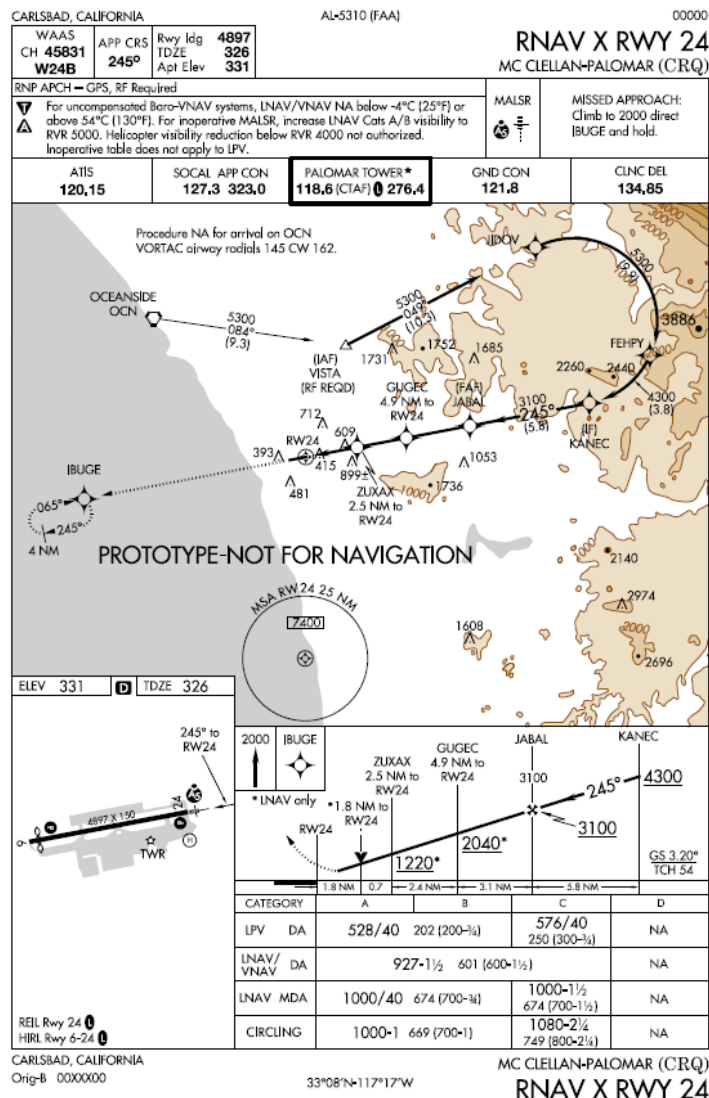
PBN Requirements Box Information

- **<u>Summary</u> – <u>Envisaged depiction of PBN Requirements Box (IAPs)</u>**

- **The FAA implements A-RNP as envisaged (mandatory RF and offset plus added mandatory requirement for scalability) and RNP AR APCH (mandatory RF and scalability)**
- **FAA does not implement scalability or offset in other Approach Nav Specs.**
  - **RF being the <u>*only*</u> optional function depicted (when applicable) for: RNP APCH and RNP 0.3. (Refer to Table 3).**

– **Envisaged depiction of PBN Requirements Box (IAPs)**

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PBN Requirements Box Information

- **<u>Summary</u>** – **Envisaged depiction of PBN Requirements Box (DPs and STARs) in U.S.#**

	RF not required for procedure	RF required for procedure	Scalability required for procedure
1	RNAV 1	N/A – RF not allowed for RNAV 1	NA@
2	RNAV 1, GPS required	N/A – RF not allowed for RNAV 1	NA@
3	RNP 1	RNP 1, GPS, RF required	NA@
4	RNP 1, GPS required	RNP 1, GPS, RF required	NA@
5	RNP 0.3, GPS required	RNP 0.3, GPS, RF required	NA@
6	A-RNP, GPS required		

- **On SID/STAR chart "departure title, then parenthetical (RNAV)"**
  - **As with the IAPs the pilot will go to PBN Box to determine Nav Spec, sensor requirements, advanced features**
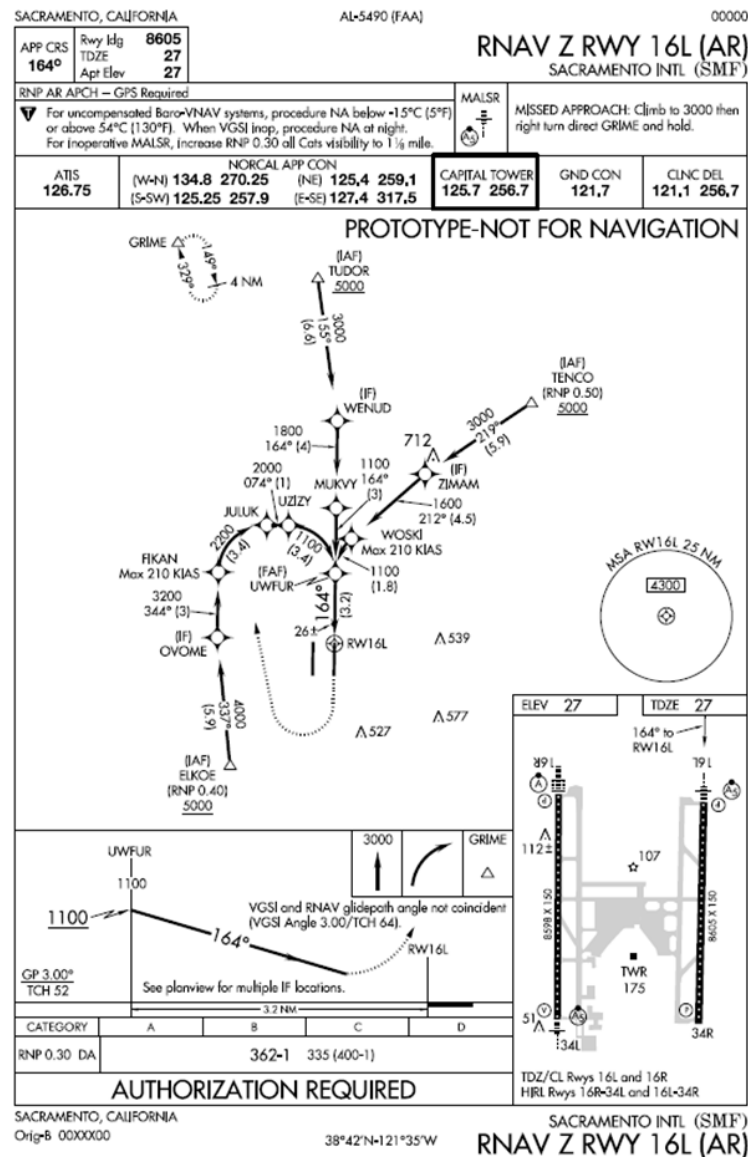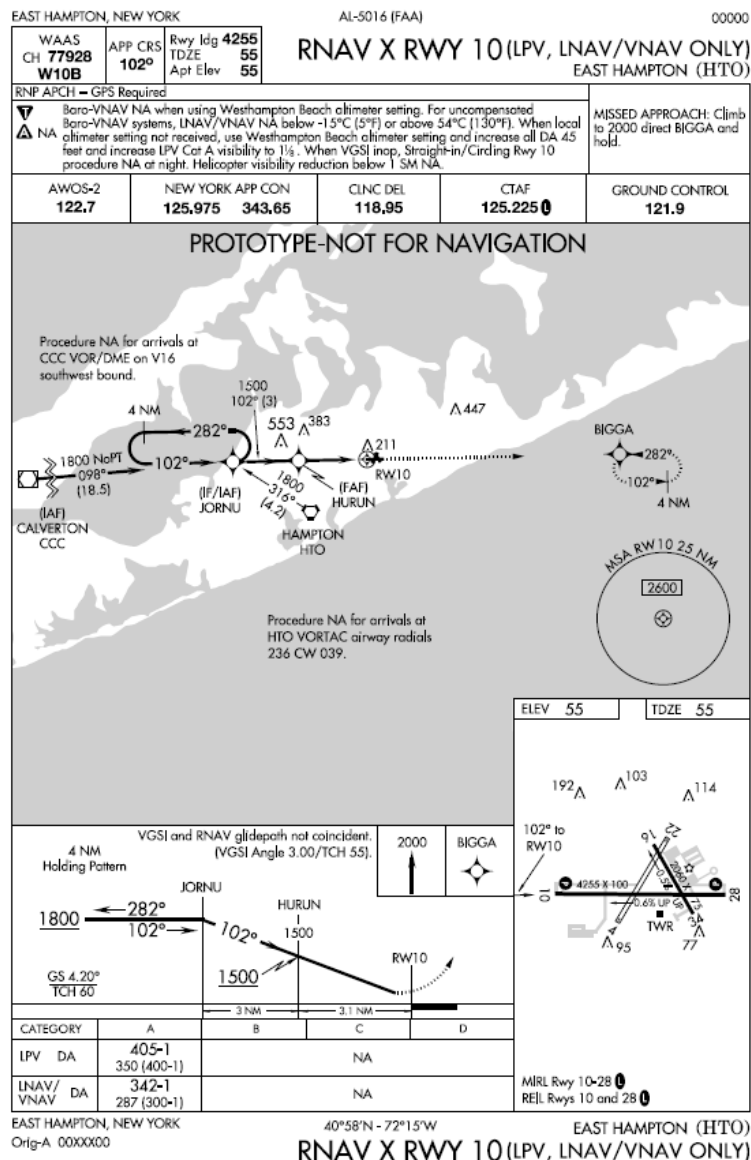
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PBN Procedure Title

- ## **Procedure Title Parenthetical - IAPs**

Condition	Suffix	Example
Procedure has only an LPV line of minima	LPV only	RNAV RWY 23 (LPV only)
Procedure has only an LNAV/VNAV line of minima	LNAV/VNAV only	RNAV RWY 23 (LNAV/VNAV only)
Procedure has both LPV and LNAV/VNAV lines of minima but no LNAV minima	LPV, LNAV/VNAV only	RNAV RWY 23 (LPV, LNAV/VNAV only)
Procedure has only an LP line of minima	LP only	RNAV RWY 23 (LP only)
Procedure used RNP AR APCH Nav Spec	AR	RNAV RWY 23 (AR)

- **Current convention of having a number of lines of minima on an RNP APCH (RNAV) chart will continue. The only time that the minima will be in the parenthetical is when there is <u>no</u> LNAV line of minima. Adding suffixes will follow current convention in the future on the RNAV IAPs.**
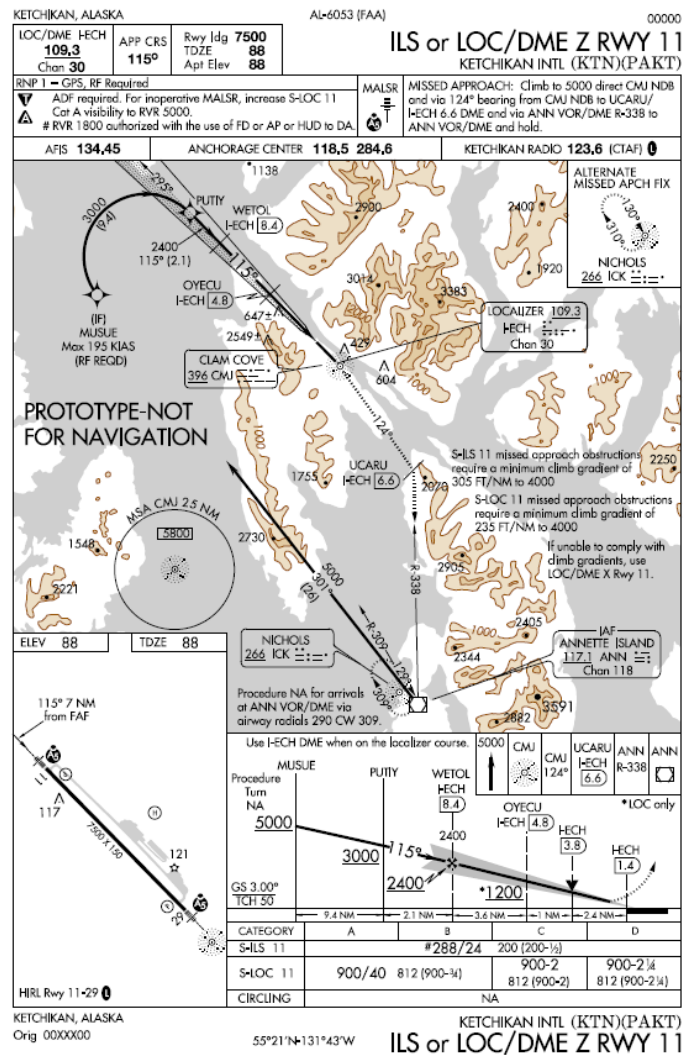
PBN Procedure Title

- **<u>Procedure Title Parenthetical - IAPs</u>**

- **Current convention of having a number of lines of minima on an RNP APCH (RNAV) chart will continue. The only time that the minima will be in the parenthetical is when there is <u>no</u> LNAV line of minima. Adding suffixes will follow current convention in the future on the RNAV IAPs.**

- **Team Response from November 10, 2014: AT agreed that the procedure title for the hybrid procedures would continue the current convention of naming the procedure based on the equipage requirement for the Final Segment.**

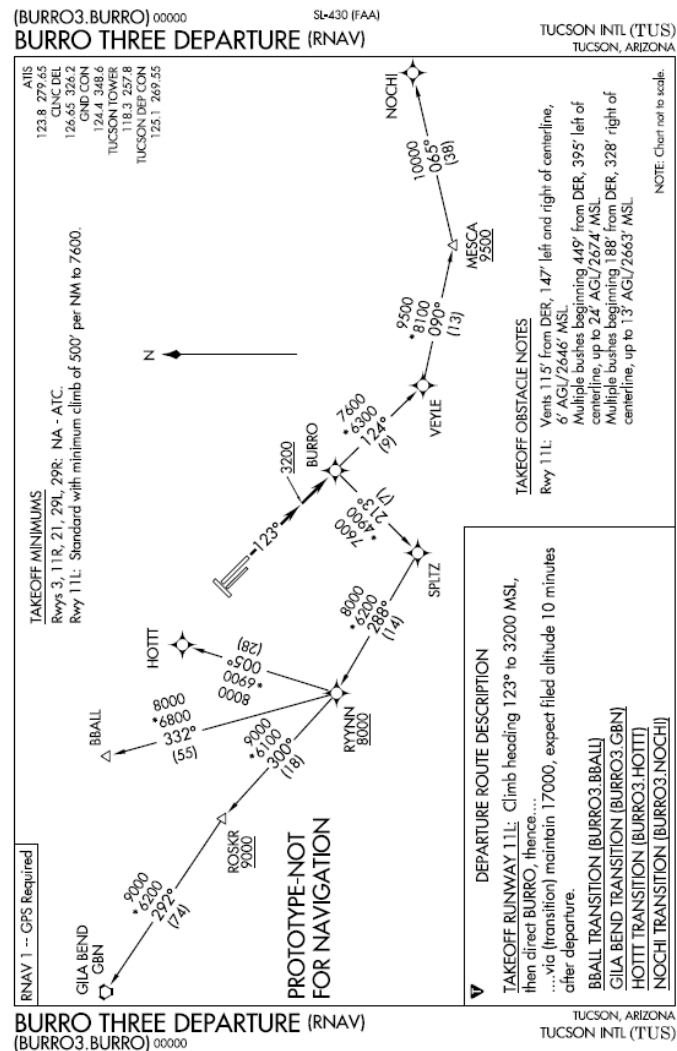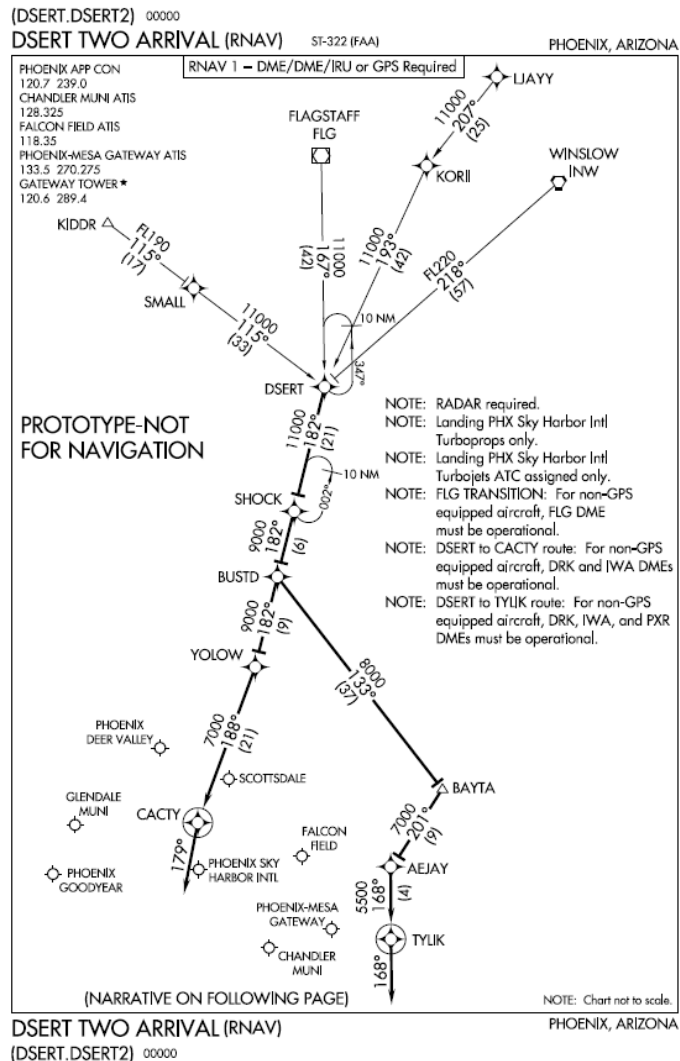| Condition	Suffix	Example
XLS with PBN transition	None	ILS RWY 23

Procedure Title Parenthetical - IAPs

PBN Procedure Title

- **<u>Procedure Title Parenthetical – DPs & STARs</u>**

- **On all SIDS/STARS on all charts "Procedure title then parenthetical (RNAV)"**
    - **As with the IAPs the pilot will go to PBN Requirement Box to determine Nav Spec, sensor requirements, advanced features.**
- **AT agreed for consistency, that the procedure parenthetical include acronym "RNAV" without the Nav Spec value and not verbalized in ATC clearance.**
    - **As is done today**

Condition	Suffix	Example
SIDS/STARS as is done today	RNAV	ZILLI ONE DEPARTURE (RNAV)

Procedure Title Parenthetical – DPs & STARs

Questions